

What is claimed is:

1. A magnetic levitation rotating machine for supporting a rotator in a levitated state by magnetic force of an electromagnet or a permanent magnet, said magnetic levitation rotating machine comprising:
 - a position detection plane provided in the rotator and a concave and/or a convex provided in the plane;
 - a displacement sensor provided on a fixed side, for detecting a displacement of the plane including the concave or the convex; and
 - a detection mechanism for detecting the displacement of the rotator and a rotating speed of the rotator from an output of the displacement sensor.
- 15 2. The magnetic levitation rotating machine according to claim 1, wherein the displacement of the rotator is detected by extracting, from the output of the displacement sensor, the displacement of the plane with the component representing the concave or the convex being removed therefrom.
- 20 3. The magnetic levitation rotating machine according to claim 1, wherein the rotating speed of the rotator is detected by extracting, from the output of the displacement sensor, pulse output corresponding to the concave or the convex.

4. The magnetic levitation rotating machine according to claim 1, wherein

at least one pair of the displacement sensors is disposed at an arbitrary angle to the center of rotation of
5 the rotator;

the detection plane is disposed so as to face the displacement sensors;

the concave and/or the convex are disposed so as to correspond to the positions of the displacement sensors at the
10 same angle as the arbitrary angle, at which the displacement sensors are disposed, to the center of rotation of the plane;
and

the position displacement and rotating speed of the detection plane are computed from the outputs of the at least
15 one pair of the displacement sensors and are output to detect the displacement of the rotator and the rotating speed of the rotator.

5. The magnetic levitation rotating machine according to claim 1, wherein the detection plane is disposed in a thrust disk formed of a magnetic material, which is an object to be controlled by an electromagnet for axial levitation position control, provided in the rotator.

25 6. The magnetic levitation rotating machine according to claim 5, wherein the displacement sensors are each disposed within the axial electromagnet.

7. The magnetic levitation rotating machine according to claim 5, wherein the displacement sensors are each disposed in outside of the axial electromagnet.

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